



U.S. Department
of Transportation

External Pipeline Coating Integrity Contract # DTPH56-06-T-000022

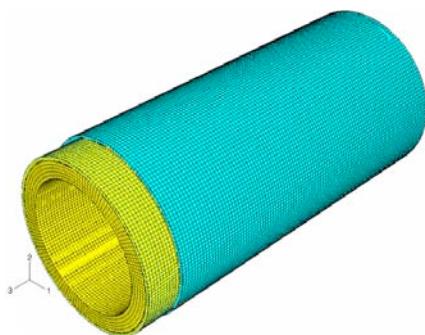
Date issued: September 15, 2006

OPS ACCOMPLISHMENTS

Pipeline Safety
Research and
Development for
Focus area

Challenge

In the pipeline industry, there are two types of coatings, fusion bonded epoxy (FBE) and 3-layer FBE/binder/polyolefin (3LPO), used to protect pipelines from external corrosion. In the US and UK, FBE is commonly used, while the 3LPO are frequently used by the rest of the world. The 3LPO is regarded as better in damage tolerance and water resistance, and has a longer service life than FBE. DOT would like to confirm that 3LPO is indeed a more reliable external pipeline coating system than FBE. If so, DOT would recommend the use of 3LPO for US pipeline operators.



Technology Description

This R&D effort is to accomplish the following tasks:

- 1) Determine the residual stresses in the pipeline coatings using analytical closed-form solutions and finite element methods simulation,
- 2) Identify the coating disbondment mechanism(s),
- 3) Develop effective test methodology to evaluate coating adhesion, durability, and strength.

Contact

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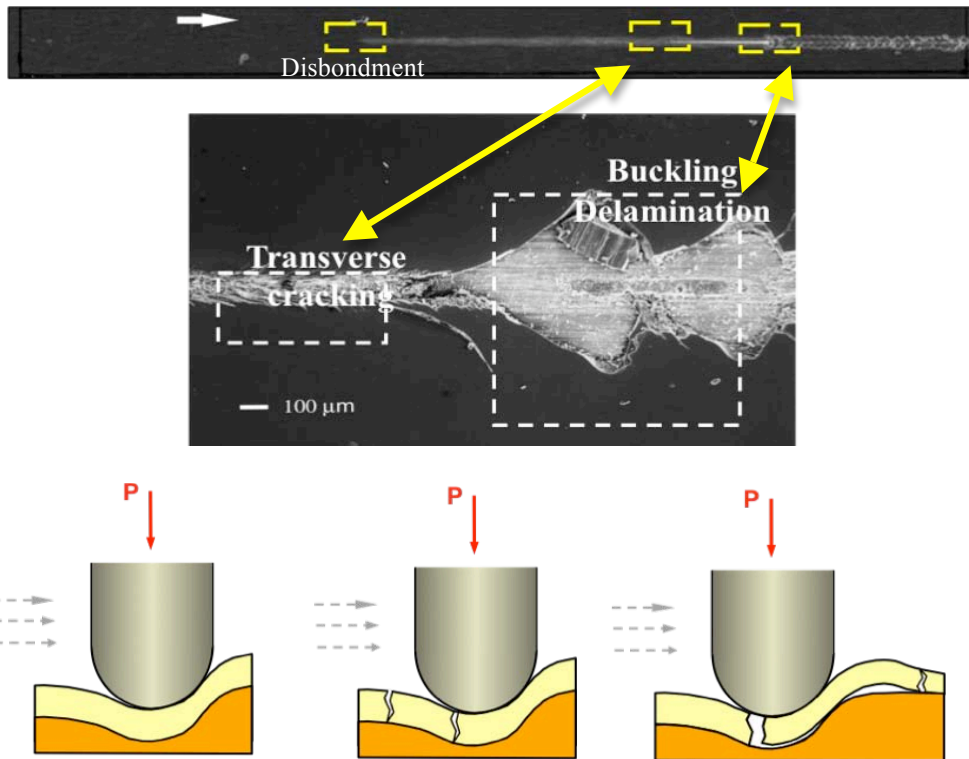
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Accomplishments

We have successfully determined the residual stresses in external pipeline coatings and identified the premature coating failure mechanisms – disbondment and cracking. New test methodology on coating performance has shown promise and is being further evaluated.

Office of Pipeline Safety

Pipeline and Hazardous Materials Safety Administration



Benefits

This research will advance pipeline safety by providing better understanding of the premature failure mechanism(s) for FBE and 3LPO pipeline coatings and describe the merits of the 3LPO pipeline coatings and its weakness against FBE.

New coating adhesion test methodology will also be developed and standardized for the pipeline industry for evaluation of coating performance and adhesive strength.

Future Activities

In the remainder of this project, we will assess the integrity of the high temperature external pipeline coatings to provide more reliable coatings for high temperature pipeline coatings. Optimal surface treatment conditions will also be determined to minimize disbondment of FBE from the steel substrate.

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